

REMARKS

Claims 1-13 were pending. Claims 1, 4-7, and 10-13 have been amended. Claims 14-16 have been added. Reconsideration of the present application is respectfully requested.

At the outset, the Examiner is thanked for the thorough review and consideration of the present application. The Examiner's Office Action dated May 6, 2003 has been received and the contents carefully noted.

In the Office Action, the Examiner objected to the drawings because lead lines from the lower left occurrence of reference sign 36 shown in Figures 1 and 4 are not pointing to the correct element. Regarding the objection to the drawings, Applicants have amended Figs. 1 and 4 so that the lead lines for reference sign 36 are pointing to the correct element. Applicants therefore respectfully request withdrawal of the objection to the drawings.

The Examiner objected to the abstract of the disclosure because of improper grammar and because there is no mention of the dummy electrodes. Regarding the objection to the abstract, Applicants have amended the abstract to correct these minor informalities. No new matter has been added.

The Examiner objected to the disclosure because of informalities on pages 7, 8, and 13-15. Regarding the objection to the disclosure, in addition to amending all of the informalities listed by the Examiner, Applicants have made additional amendments to correct grammatical errors, for example, by replacing "fix" with --fixed-- throughout the specification. In addition, Applicants respectfully submit that "fF" represents "femto Farad," a unit of capacitance, 10^{-15} farads, and that its use in the specification on page

14 is correct. Applicants respectfully request that the objection to the disclosure be withdrawn. No new matter has been added.

The Examiner objected to the claims because of informalities. Regarding the objection, Applicants have amended the terminology "fix" and replaced it with --fixed-- in the claims. Applicants respectfully request that the objection to the claims be withdrawn.

The Examiner rejected claims 1-13 under 35 USC 112, second paragraph, as being indefinite. Applicants respectfully traverse this rejection.

Regarding claim 13, Applicants have amended the claim to change "said signal electrode" to --said detection electrode--.

Regarding claims 1 and 7, Applicants have amended the terminology "fix portion including with electrical insulation" to -- said ~~fix~~ fixed portion ~~including with~~ having electrical insulation and including--.

Regarding claims 5 and 12, Applicants have eliminated redundancies by amending the terminology "fix portion further includes with electrical insulation" to -- fixed portion further includes ~~with electrical insulation~~ --.

Regarding claims 4, 10, and 11, Applicants have amended the terminology "near" to --adjacent to--.

Regarding claims 5 and 12, Applicants have deleted the terminology "near said output electrode" from these claims.

Applicants respectfully submit that all of the claims comply with 35 USC 112, second paragraph and request that the rejection of claims 1-13 under 35 USC 112, second paragraph be withdrawn.

The Examiner rejected claims 1-4, 6, and 13 under 35 USC 103(a) as being unpatentable over Kobayashi (US Patent No. 5,969,225) in view of Itou et al. (US Patent No. 6,119,518). This rejection is respectfully traversed.

Claim 1, as amended, is allowable at least for the reason that claim 1 recites a combination of features including, for example,

“...a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire having electrical insulation.” [emphasis added]

Claim 13, is amended, is allowable at least for the reason that claim 13 recites a combination of features including, for example,

“...a shield wire pad arranged between said drive electrode and said detection electrode which is neighbor to said drive electrode;...
...a detection wire for connecting said detection electrode to said circuit substrate; and
a shield wire connected to said shield wire pad and a constant potential at said circuit substrate to provide capacitive shielding between said drive signal wire and said detection wire.” [emphasis added]

None of the cited references singly or in combination teaches or suggests at least these features of the claims.

In the semiconductor device of the present invention, shield wires 70 can reduce the capacitive coupling between the drive wire and the detection wires 52. The presence of the shield wires 70 prevents the drive signal component from entering the detection signal and the monitor signal through capacitive coupling, i.e., stray capacitance, between

the drive wire 42 and the detection wires 52 and between the drive wire 42 and the monitor wires 62. Moreover, the monitor signal is accurately detected to control generation of the driving signal, so that the movable portion 30 can be accurately driven. Furthermore, this enables the distance between wires on the chip to be shortened so that the whole circuit can be miniaturized. *See* Specification at page 13, paragraph beginning on line 22.

Kobayashi discloses an angular-velocity detection apparatus which includes a substrate 22 and a vibrating body 26. On page 3 of the Office Action, the Examiner refers to column 4 of the Background of the Invention section of the reference as recognizing the problem of parasitic capacitance causing leakage of drive signals into the detecting means. The Examiner states that Kobayashi lacks a shielding means and cites Itou et al. in an attempt to cure the deficiencies of Kobayashi.

The Examiner states that electrostatic shielding is a well-known solution to the problem of capacitive coupling. Applicants respectfully request that the Examiner specifically cite the portions of the references that disclose or suggest using and locating a shield wire and pad in the manner recited in claims 1 and 13 as required by MPEP 2144.03. In addition, the Examiner appears to take Official Notice that the physical placement of the shield would not change and/or alter the performance of the semiconductor device of the present invention, which is contrary to Applicant's disclosure. Applicants traverse the assertion of Official Notice and respectfully request that the Examiner cite a reference to support his assertion of Official Notice in the next Office Action.

Regarding Itou et al., this reference relates to an angular velocity sensor comprising a semiconductor oscillator, an oscillation exciting unit formed in the surface of the semiconductor oscillator, and an oscillation detecting unit. At least one of electrode wiring lines to be connected with the oscillation exciting unit and electrode wiring lines to be connected with the oscillation detecting unit is covered on its surface with a shield film. *See* column 3, line 50 to column 62.

Itou et al. discloses, for example, that the oscillator is made of a semiconductor substrate, and at least a plurality of electrode wiring lines connected with said first and second driving piezoelectric elements and electrode wiring lines connected with the angular velocity detecting piezoelectric elements are covered on their surfaces with a shield film 109 so that they are shielded from other electrode wiring lines. The shielding structure according to claims 1 and 13 of the present invention is different from the shielding structure according to the reference Itou et al.

In the present invention, the pad 71 is connected to the shield wire 70 on the substrate 12 at a location other than the input electrode 40 and pad 41 and the output electrode 50 and pad 51. The shield wire 70 located between the input electrode 40 and the output electrode 50 provides electrostatic insulation

Thus, the combination of references fails to teach a pad connected to a shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire having electrical insulation as recited in claim 1. In addition, the combination of references fails to teach a shield wire pad arranged between said drive electrode and said detection electrode and a shield wire connected to

said shield wire pad and a constant potential at said circuit substrate to provide capacitive shielding between said drive signal wire and said detection wire as recited in claim 13.

It can thus be understood that the combination of references do not in any way make obvious the essential features of the present invention as set out in independent claims 1 and 13.

Moreover, as claims 2-4 and 6 each depend from independent claim 1, each of these claims is also allowable for the same reasons as their respective base claim.

As the cited references fail to make obvious the present invention as recited in claims 1-4, 6, and 13, Applicants respectfully request that the rejection of claims 1-4, 6, and 13 under 35 USC 103(a) be withdrawn.

The Examiner rejected claims 5 and 7-12 under 35 USC 103(a) as being unpatentable over Kobayashi in view of Itou et al. as applied to claims 1-4, 6, and 13 above, and further in view of Ward (US Patent No. 6,445,195). This rejection is respectfully traversed.

Claim 7, as amended, is allowable at least for the reason that claim 7 recites a combination of features including, for example,

“...a monitor electrode for monitoring capacitive variation based on vibration of said movable portion in said first predetermined direction and supplying a monitor signal to said circuit substrate;...
...a monitor wire for connecting said monitor electrode to said circuit substrate;
a shield wire connected to a constant potential at said circuit substrate to provide capacitive shielding between said input wire and said output wire and between said input wire and said monitor wire; and
a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire

and output wire and between said input wire and said monitor wire with electrical insulation.” [emphasis added]

None of the cited references singly or in combination teaches or suggests at least these features of the claims.

On pages 4 and 5 of the Office Action, the Examiner states that the combination of Kobayashi in view of Itou et al. does not specifically teach monitor and dummy electrodes. The Examiner cites Ward in an attempt to cure the deficiencies of the other two references.

Ward teaches a drive feed through nulling system including a feed through nulling compensator 36 used in conjunction with a feedback gain control loop 38. The feedback gain control loop is operative to receive a signal 90 from the position sensitive pick off 28.

The Examiner states that the dummy electrodes of claims 5 and 12 could read on any shielding electrode or other electrode. However, the dummy electrode of the present invention generates an induced signal of the input (drive) signal. In contrast, Ward discloses that the amplitude of the drive signals of the measured components is adjusted so that drive feed through in the sense of the preamplifier output is automatically and continuously nulled. *See* column 9, lines 8-29. The induced components of the present invention are different from the signal obtained by adjusting the amplitude of the drive signal because of phase or ratios of harmonic components. Thus, the combination of references fails to teach the dummy electrodes of the semiconductor device as recited in claims 5 and 12.

Claim 7 has been amended similarly to claims 1 and 13 described above. As discussed above, the combination of Kobayashi and Itou et al. fails to teach a shield wire and a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire and between said input wire and said monitor wire with electrical insulation as recited in claim 7. Ward fails to cure the deficiencies of the other references because there is no description of a shield wire and pad as recited in claim 7.

It can thus be understood that the combination of references do not in any way make obvious the essential features of the present invention as set out in independent claims 1 and 7.

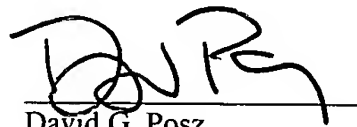
Moreover, as claim 5 depends from independent claim 1 and claims 8-12 depend from independent claim 7, each of these claims are also allowable for the same reasons as their respective base claims.

As the combination of references fails to make obvious the present invention as recited in claim 5 and 7-12, Applicants respectfully request that the rejection of claims 5, and 7-12 under 35 USC 103(a) be withdrawn.

Newly added dependent claims 14-16 further limit claim 1, 7, and 13, respectively by further reciting features regarding the location of the pad. Applicants respectfully submit that new claims 14-16 are allowable over the cited references.

In view of the above remarks, the present application is believed to be in condition for allowance. A prompt notice to that effect is respectfully requested. Although no additional fees are believed to be due, permission is hereby given to charge any unforeseen fees to deposit account 50-1147.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'DGP', is written over a horizontal line.

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